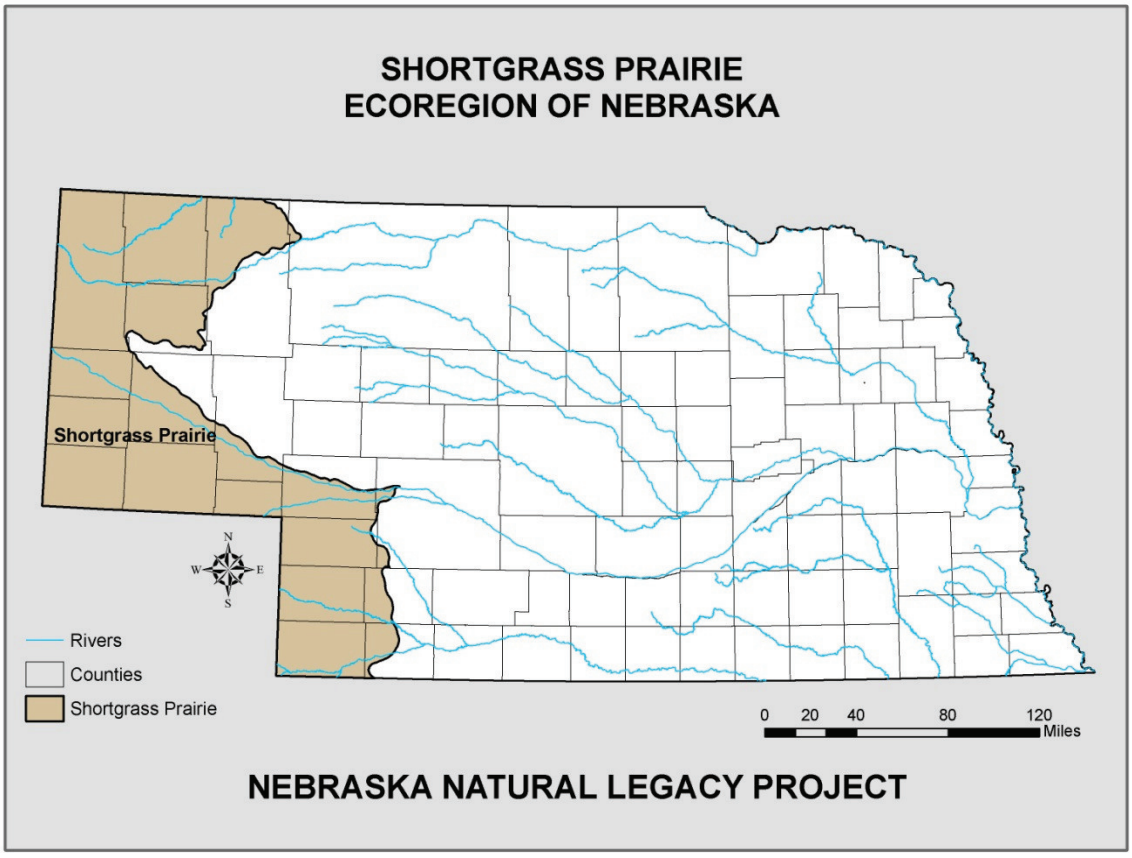
Chapter 8

Shortgrass Prairie Ecoregion



Introduction

Though referred to as the Shortgrass Prairie Ecoregion, much of western Nebraska supports dry mixed-grass prairie in addition to areas of short-grass, sandsage prairie, sand prairie, pine woodlands, badlands, and other vegetation types. The ecoregion features diverse topography, including several areas of rocky escarpments. Soils range from sands to clays, with a greater variety of soil types than other ecoregions of the state. Annual precipitation ranges from 12 to 17 inches. Temperatures average highs of 90 degrees Fahrenheit in mid-summer and average in the low teens in mid- winter. Humidity is generally low.

Threadleaf sedge western mixed-grass prairie is the predominant vegetation type in the ecoregion, though northwestern mixed-grass prairie dominates on the shale-derived soils north of the Pine Ridge. True short-grass prairie is limited to dry knobs and areas with very clayey soils. Sandsage prairie is most common in Dundy, Chase, and Perkins counties and sand prairies are scattered throughout the ecoregion. Ponderosa pine woodlands occur on rocky escarpments, primarily the Pine Ridge and Wildcat Hills. Badlands and rock outcrop communities are also present on escarpments.

The North Platte River bisects the ecoregion and has wet meadows, deciduous woodlands, and numerous tributary streams, many of which are coldwater. Other streams in the ecoregion include Lodgepole Creek in the southern panhandle and the upper Niobrara and White Rivers in the north. Natural wetlands are somewhat limited in the ecoregion, though playa wetlands are abundant in areas of the southwest and are scattered northward. Five large reservoirs and a number of smaller artificial lakes provide additional habitat for game fish, amphibians, invertebrates, and waterbirds. The ecoregion contains numerous small streams, many of which are ephemeral (may or may not be wet year-round).

Vegetation

Short-grass prairies are dominated by grasses such as buffalo grass and blue grama. Common forbs in this prairie type include milk-vetches, scarlet gaura, cutleaf ironplant, prickly pear, purple locoweed, slender-flower scurf-pea, prairie-coneflower, and scarlet globe-mallow. The low precipitation in the Shortgrass Prairie Ecoregion, in conjunction with grazing, causes most short-grass vegetation to rarely exceed 10 inches in height.

Mixed-grass prairie is also common in the ecoregion. Northwestern mixed-grass prairie is prevalent north of the Pine Ridge and threadleaf sedge western mixed-grass prairie is most common south of the Pine Ridge. Mixed-grass prairies in the ecoregion are typically dominated by blue grama, prairie sandreed, threadleaf sedge, needle-and-thread grass, green needle grass, little bluestem, and western wheatgrass. Some of the mid-grass species can reach 18 to 24 inches in height, but they are often shorter because of local management and precipitation. Shrubs found in mixed-grass prairies include skunkbush sumac, rubber rabbit-brush, sagebrushes, snowberry, yucca, and broom snakeweed. Numerous forbs can be found in these prairies, with common species including scarlet gaura, dotted gayfeather, skeletonplant, cutleaf ironplant, lemon scurf-pea, and scarlet globe-mallow.

Sandsage prairie is distinguished from other sand prairie types by its high cover of sand sagebrush. Other common plants in sandsage prairie include blue grama, prairie sandreed, needle-and-thread, yucca, sand-lily, desert goosefoot, plains sunflower, bush morning-glory, and showy ipomopsis. Additional sand prairie types in the ecoregion include Sandhills dune prairie and western sand prairie. These communities share many common species with sandsage prairie but lack the characteristic cover of sandsage brush. Western alkaline meadows are common in stream valleys of the ecoregion. They can be found along the North Platte, Niobrara River, and Pumpkin Creek. Common plants in these meadows include inland saltgrass, alkali sacaton, clustered field sedge, foxtail barley, and bluegrass, spearscale, rayless alkali aster, viscid camphor-daisy, and entire-leaf thelypody. Freshwater meadows and marshes are also relatively common in stream valleys. These wetlands are dominated by a variety of grasses, sedges, bulrushes, and cattails.

Open canopies of tall cottonwoods and shorter peachleaf willows dominate riparian woodlands in many stream valleys of the ecoregion. Sub-canopies often consist of green ash, box-elder, Russian-olive, and junipers. Sandbar willow is a common shrub, but wild goose plum, chokecherry and silver buffalo-berry are also present on higher terraces and banks. The herbaceous layer is sparse and may include field horsetail, Emory's sedge, woolly sedge,

marsh muhly, and prairie cordgrass. Riparian woodlands and shrublands have become more prevalent on the North Platte River over the last half century because of dams reducing scouring flows.

Pine woodlands are dominated almost solely by Ponderosa pine, though limber pine occurs in a small area of Kimball County. Saskatoon serviceberry, chokecherry, dwarf juniper, skunkbush sumac, mountain-mahogany, and wolfberry are common shrubs in the pine communities. Common grasses and forbs under the pines include sun sedge, needlegrasses, prairie sandreed, bog buckbean, fragile fern, white sage, and yucca.

Badlands are largely unvegetated but often have a sparse cover of low shrubs such as saltbush and rubber rabbit-brush and forbs such as silver orache, poverty-weed, and Russian-thistle. Mixed-grass prairie often occupies gentle slopes and flat border badlands. Rock outcrop communities are common on escarpments in the ecoregion. Plant species diversity can be high on the outcrops with common species including milk-vetches, Hood's phlox, stemless tetraneuris, grama grasses, and thick-spike wheatgrass.

Animals

More than 300 species of resident and migratory birds have been recorded in the short-grass prairie ecoregion. Common short-grass prairie species include McCown's and chestnut-collared longspurs, Brewer's sparrow, horned lark, burrowing owl and the state threatened mountain plover. Species commonly found in the mixed-grass prairie community include western meadowlark, grasshopper sparrow, and lark bunting. The pine ridge region includes many forest species such as Lewis's woodpecker, pygmy nuthatch, ovenbird, and mountain bluebird. The region's wetlands support many species of waterfowl including Canada goose, mallard, and northern pintail, and shorebirds such as western sandpiper and greater yellowlegs.

A variety of mammals are known to occur in the ecoregion. Ungulates include both white-tailed and mule deer, elk, pronghorn, and bighorn sheep. Coyotes and bobcats are the most common large predators but in recent years, mountain lions have also been recorded in the Panhandle. The ecoregion serves as one of the remaining strongholds for the diminutive swift fox, a state endangered species. Prairie dogs are locally abundant, and the federally endangered black-footed ferret (*Mustela nigripes*) was once present in the ecoregion. Other mammals include the river otter, black-tailed jackrabbit, American badger, plains pocket gopher, and northern grasshopper mouse.

The aquatic habitats of Nebraska's Panhandle support numerous species of fish. The region's lakes and reservoirs have been stocked with game fish such as walleye, largemouth bass, white bass and bluegill. River-associated species include channel catfish, river carpsucker, the state-threatened finescale dace, state-endangered blacknose shiner, shovelnose sturgeon, western silvery minnow, plains minnow, suckermouth minnow, flathead chub, blacknose dace, plains topminnow, and Iowa, Johnny, and orange-throat darters. Brown trout and rainbow trout have been stocked in cold water streams in the ecoregion.

Many species of amphibians and reptiles are known to occur in the Shortgrass Prairie Ecoregion. Amphibians include boreal chorus frog and Woodhouse's toad. Reptiles include bullsnake, prairie rattlesnake, lesser earless lizard, mountain short-horned lizard, ornate box turtle, and northern painted turtle.

History and Dominant Land Use

At the time of settlement**,** nomadic tribes of Pawnee, Sioux and Northern Cheyenne used the region for hunting bison and other game. The Oregon and Mormon Trails, which crossed the region, carried thousands of settlers westward during the western expansion of the 1840's and 1850's, but relatively few individuals settled in the ecoregion during this time.

The Homestead Act of 1864 spurred settlement by providing 160 acres to homesteaders who could "improve" their land claim within five years. An additional 160 acres could be acquired if a sufficient number of trees were planted on the claim site. Completion of the transcontinental railroad brought an increasing number of settlers to this part of Nebraska in the late 1860s. Tracts of grassland as far as the eye could see were very enticing to cattlemen. Vast ranches were established, primarily on public land. Cattle thrived on the short, warm-season grasses such as buffalo grass and blue grama which were rich in protein even after dormancy. The Kincaid Act of 1904 allowed homesteaders to increase their land claim to 640 acres, making farming the dry prairies less risky. Section-sized farms started springing up and large ranchers who formerly ran cattle freely across the open plains, faced new difficulties.

The Reclamation Act of 1902 proved to be the impetus for irrigating the arid lands and encouraging crop production in the ecoregion. A few farmers along the Owl and Winter Creeks in Scotts Bluff County dug canals by hand to bring river water to their crops in 1887. Canal associations soon followed allowing accelerated development of irrigation systems. By 1909, enough sugar beets were being produced to support Scottsbluff's first sugar factory. At the height of sugar beet production in the 1920's to early 1930's, there were five factories in the Scottsbluff area.

Land that did not have access to irrigation water grew primarily winter wheat. This crop did very well with limited rainfall, especially under a summer fallowing rotation (resting the land every other year to preserve subsoil moisture). Dry beans were another prominent crop of the region. One-hundred acres of dry bean crop were first planted in the region in 1927. In subsequent years, the area became one of the major dry edible bean-producing regions of the nation.

During the 1920's, the Shortgrass Prairie Ecoregion saw dramatic changes as conversion of prairie to cropland intensified. Nineteen twenty-nine marked the onset of a seven-year drought – the Dust Bowl. Below average precipitation combined with high temperatures and driving winds created the worst drought in the region's recorded history. The drought, coupled with the nation's economic depression, left many farmers and ranchers in the region in economic ruin.

The 1940's saw a recovery in the ecoregion and many farms and ranches once again prospered. Improvements in farming efficiency in the 1950's through 1960's lead to dramatic increases in crop production. The wide-scale use of center pivot irrigation systems in the 1970's and 1980's brought previously un-farmed land into crop production. In the late 1990's, severe drought returned to the area and the amount of land under cultivation began to decline. Moratoriums on new groundwater development were put in place to help safeguard depleted water resources. No-till farming and dry land crops such as sunflowers received wider acceptance during the late 1990's.

Currently, almost 87 percent of the land in the northwest portion of the ecoregion is in grass and used for grazing and nearly 88 percent of the land in the southeast part of the ecoregion is under crop production. Of the 5.6 million acres of land in the Shortgrass Prairie Ecoregion, 2.28 million acres are cropland, half of which are irrigated. Approximately 2.75 million acres are in grassland and used principally for grazing. A very small portion of the ecoregion is native woodland.

The Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program (CREP) have taken tens of thousands of acres of cropland out of production and returned it to grassland. Because of declining groundwater and surface water resources in the ecoregion, many CRP and CREP lands will likely remain in grassland even after contracts expire.

The current trend is towards fewer but larger farms and ranches in the ecoregion. This trend is being driven by economics and a loss of residents in rural areas to more populated towns and cities. Many landowners have concerns about future land acquisitions for public use and its impact on sustaining a ranching tradition. The northern portion of the Panhandle has a much higher percentage of land area in public ownership than in other parts of the state. Recent efforts to promote agri-tourism have stimulated the local economy. Promoting the region's biological diversity and unique landscape could likewise lead to increased economic sustainability.

Nature-based Recreation

The Shortgrass Prairie Ecoregion has a wealth of natural amenities. The region is a well-known destination for the natural history enthusiast, hunters and anglers, hikers, and the casual visitor interested in varied scenery. Six of the top ten tourist attractions in Nebraska are found in the ecoregion and all are based at least in part on natural amenities. Tourism is the second largest industry in the Panhandle, generating $40 million in retail dollars in Scotts Bluff County alone.

The ecoregion is home to Lake McConaughy, the largest reservoir in the state and a well-known destination for anglers, bird watchers, hunters, and campers. The reservoir supports trophy-sized striped bass and walleye, and the adjacent Lake Ogallala is one of the best rainbow trout fisheries in the Great Plains. Over 340 species of birds have been observed at

Lake McConaughy, more than any other site in Nebraska. Several hundred eagles can be seen during the winter from a heated eagle viewing facility below the dam.

Nebraska's Pine Ridge offers some of the most scenic vistas in the state. The 22,000-acre Fort Robinson State Park provides opportunities to observe bighorn sheep and bison. A small but growing elk herd in the Pine Ridge provides hunting and wildlife-viewing opportunities. Anglers can enjoy quality trout fishing in the area's coldwater streams, and wild turkey and deer hunting opportunities abound. Fort Robinson offers several trail types, including equestrian trails. In addition to Fort Robinson and Chadron State Parks, numerous state wildlife management areas, the Nebraska National Forest (Pine Ridge District) and Soldier Creek Wilderness Area also occur on Pine Ridge. Oglala National Grassland and Toadstool Geologic Park, both administered by the U.S. Forest Service are located north of Pine Ridge and provide their own unique habitats and outdoor recreation opportunities.

A second prime recreational area in the ecoregion is the Wildcat Hills located south of the North Platte River in Scotts Bluff and Banner Counties. The Wildcat Hills Nature Center is the region's leading environmental education center. A variety of programs are offered to adults and children about the region's unique flora and fauna and a trail system accommodates wildlife viewers. The nearby Scotts Bluff National Monument has a three-mile scenic trail that leads to the summit of the monument. There are currently plans for a 26-mile network of trails and greenways that generally follow the North Platte River and link Scottsbluff and Gering with Scotts Bluff National Monument.

Recently, economic development in the ecoregion is becoming more entwined with the natural amenities of the area. Declining rural populations and diminished agricultural opportunities are changing the make-up of the ecoregion and may be contributing to the new economic direction. Nature-based recreation is providing new opportunities in the Shortgrass Prairie Ecoregion.

A challenge to expanding nature-based recreation and conserving biological diversity in the region is the need to involve a greater portion of the area's citizens in these activities. Individuals from the business, economic development, and agricultural sectors need to be involved in planning, promotion, and development of nature and wildlife tourism. There is no centralized clearinghouse of wildlife-viewing information, and there is a significant lack of wildlife-viewing infrastructure in the ecoregion. Although there are many quality opportunities for nature-based recreation, access points are limited or obscured, interpretive information is lacking, and promotion of viewing opportunities is minimal. More individuals knowledgeable about wildlife-viewing are needed to help inform community leaders and the public about the ecoregion's potential.

Education

Environmental education has long been viewed as a critical element of conservation in the Shortgrass Prairie Ecoregion, with efforts to bring wildlife education into the classroom ongoing for several decades. Educational Service Unit #13 in Scottsbluff has been a model for working collaboratively with agencies and private organizations to facilitate environmental education in the region's schools. The Wildcat Hills Nature Center in Gering

was built to help students and adults learn about natural history of the area. Small classroom size in schools of the Panhandle affords opportunities for student-centered learning but often requires that a larger number of teachers be trained in environmental education. Rural schools sometimes have more space available for outdoor classrooms or may even be located close to natural areas that can be used for field trips.

The region's larger schools are experiencing increases in enrollment. In addition, constraints on teachers to meet new and existing curriculum requirements often leaves little time for environmental education. Understanding and addressing cultural differences in environmental education programming is also important as the student population becomes more ethnically-diverse. Another challenge is that western Nebraska teachers are often not able to travel to the eastern part of the state for environmental education training because of the distance.

Regardless of the challenges, surveys indicate that interest in wildlife education is high in the region and nearly all schools incorporate wildlife themes in the classroom. In addition, several environmental education programs take place in the ecoregion each year. These include but are not limited to "Water Education for Tomorrow," "Branch Out," "Panhandle Eco Extravaganza about Prairie (PEEP)," "Educational Bird Banding Stations," "Let's Rock," and "Environ-Art." The Riverside Discovery Center in Scottsbluff offers a zoo and a natural history and children's museum for locals and visitors to the region. Rocky Mountain Bird Observatory conducts landowner workshops, pre-service training, PEEP, and participates in environmental education programs about the ecoregion. More specific details about these programs and more are available by contacting the Project WILD Coordinator at the Nebraska Game and Parks Commission.

Despite the rich natural heritage of the ecoregion, there is often a lack of understanding and awareness of the ecoregion's biological diversity. Some ranchers and farmers who have a unique understanding of the region and relevant wildlife experiences are willing to share their knowledge can help rectify this problem. Increased collaboration amongst environmental educators, resource professionals, teachers, farmers and ranchers, and community leaders could lead to increased understanding of various viewpoints and increase education capacity.

Potential actions include educational programming to reach out to agricultural producers and working with post-secondary education administration to provide curriculum for new professionals on habitat management techniques compatible with agricultural operations. Targeted education efforts can teach individuals how to recognize invasive species, prevent their spread, and implement control measures. Education programs could also demonstrate alternative land uses (e.g., tourism, hunting, fishing) that could supplement landowner incomes without any additional loss of wildlife habitats.

Organizations and Partnerships

The Shortgrass Prairie Ecoregion has partnerships, coalitions, and grass-roots efforts to conserve the region's biodiversity values. Groups include, but are not limited to, the following:

In 2001, **Nebraska Prairie Partners (NPP)** was formed in cooperation with the Rocky Mountain Bird Observatory (RMBO) and Nebraska Game and Parks Commission (NGPC). These groups recognized a need for bird population monitoring and landowner outreach in western Nebraska to facilitate avian conservation. RMBO has expertise in bird conservation, field monitoring, and landowner outreach. NGPC has local infrastructure, funding, and a proven private lands incentive program. The project's objective is to conserve and enhance prairie habitat on private lands by implementing grassland bird monitoring and research and providing outreach, technical expertise, and financial incentives to landowners. Target species include burrowing owl, ferruginous hawk, and mountain plover. To date, approximately 500 private landowners have been involved in the program. NPP projects are supported by grants from the Nebraska Game and Parks Commission, U.S. Fish and Wildlife Service, the Nebraska Environmental Trust Fund, and Playa Lakes Joint Venture.
www.rmbo.org

Platte River Basin Environments, Inc. (PRBE) was organized officially in 1991. This organization seeks to acquire and manage North Platte River Valley and Wildcat Hills lands for conservation, recreation, and education. Led by avid sportsmen and conservation enthusiasts, its members also have expertise in hydrology, geology, range management, and wildlife biology. Since its formation, PRBE has secured over $20 million in grants and donations for conservation from groups such as the Nebraska Environmental Trust, North American Wetlands Conservation Act, Oregon Trail Community Foundation, Ducks Unlimited, Pheasants Forever, National Wild Turkey Federation, Peter Kiewit Foundation, and the Private Stewardship Grant Program. PRBE efforts earned them the 2004 National Wetlands Conservation Award. Properties PRBE has helped acquire and protect include: Wildcat Hills Nature Center, Cedar Canyon Wildlife Management Area (WMA), Kiowa WMA, Faucus Springs WMA, Chadron Creek WMA, and PRBE's Mitchell Valley Units, Spotted Tail Units, Horse Creek Units, Bead Mountain Ranch, Montz Ranch, and Carter Canyon Ranch.
nebwild.org

The Playa Lakes Joint Venture was formed in 1989 to conserve playas and associated habitats for birds and other wildlife in parts of six states in the western Great Plains. Since its inception, the PLJV has raised millions to conserve more than 100,000 acres of playas, other wetlands, and associated habitats in the High Plains. The activities of the PLJV are guided by a master plan that provides direction for conservation activities at the regional level. The Joint Venture is a regional partnership of federal and state wildlife agencies, conservation groups, industry and private landowners. Partners include: the U.S. Fish and Wildlife Service, U.S. Forest Service, Ducks Unlimited, The Nature Conservancy, Pheasants Forever, Conoco-Phillips, and state wildlife agencies of Colorado, Kansas, Nebraska, New Mexico, Oklahoma and Texas – and via these partners numerous landowners.
www.pljv.org

Ecoregion-specific Stresses

Key Stresses

In addition to the stresses and conservation actions identified in this chapter for the Shortgrass Prairie Ecoregion, statewide concerns are identified also in chapter four. Conservation practitioners identified the following stresses as the top threats in the ecoregion.

Altered frequency, duration, and intensity of natural disturbances: Short-grass and mixed-grass prairies in the ecoregion historically were subject to intensive short-duration grazing by native herbivores followed by periods of rest. Constant season-long grazing by cattle has changed plant and animal composition by favoring a relatively small proportion of species adapted to prolonged grazing. Periodic fires historically burned through expansive areas of prairie and Ponderosa pine forest. The lack of fire has altered species composition and structure of grasslands, forest, and wetlands.

Altered hydrology and channel degradation of rivers and streams: Rivers, streams, and wetlands in the ecoregion are being stressed by surface water diversions and groundwater withdrawals. The loss of water in aquatic communities jeopardizes many species. A lowering of the water table along rivers and streams changes plant composition and often promotes the spread of invasive species. For example, reduced flows to the Platte and Republican rivers have contributed to a shift from a grass/forb-dominated community to trees and shrubs.

Spread of invasive species: Invasive species are a major threat to the ecoregion's biological diversity. Cheatgrass, Russian-olive, reed canary grass, saltcedar, eastern red-cedar, narrow-leaf cattails, and other species have competitively excluded native plants and degraded habitat for fish and wildlife. Mountain pine beetles have also recently entered the region and may become problematic in pine woodlands.

Excess deer browsing: Over-browsing by deer can degrade native woodlands and impact agricultural production in areas.

Lack of knowledge about the region's biological diversity and ecological processes: Residents have limited opportunity to learn about the region's native plant and animal species. Most school-aged children and adults know little about the area's species and threats to biological diversity. Landowners have limited access to information on management methods that can be used to sustain natural communities and biological diversity on their land.

Conversion and fragmentation of natural habitats: Although large areas of the ecoregion are still intact, sub-division of larger ranches into ranchettes and smaller acreages is resulting in loss and fragmentation of natural communities. Second-home construction along rivers, native forests, and near recreational areas is also leading to fragmentation of native plant communities. Agricultural conversion of grassland continues in the ecoregion.

Agricultural economics: The agricultural community in the ecoregion is driven by a high level of pride and personal responsibility for sustaining the region's unique natural resources. Economic hardships are changing ownership patterns (e.g., more non-resident owners, larger corporate farming operations), which could affect management decisions and ultimate stewardship of the land.

Poorly-sited utility-scale wind turbines: Wind energy development is a growing industry in the Great Plains. There are many benefits to cleaner and renewable energy sources; nevertheless, in order to conserve the biodiversity of the Shortgrass Prairie Ecoregion, it is important to carefully consider the placement of wind turbines in order to minimize negative impacts to wildlife. Whenever possible, turbines and their associated power lines and access should be sited in areas that have already been significantly disturbed (e.g., cropland, old railway/road corridors). See Nebraska Game and Parks Commission guidelines for wind energy development.

Biologically Unique Landscapes of the Shortgrass Prairie Ecoregion

A goal of the Nebraska Natural Legacy Project is to identify priority landscapes that, if properly managed, will conserve the majority of the state's biological diversity. These landscapes, referred to as Biologically Unique Landscapes (BULs), were selected based on the occurrences of at-risk species and natural communities. See Chapter 3 for a description of the methods used to select the landscapes.

The map on the following page shows the BULs for the Shortgrass Prairie Ecoregion. Following the map are brief descriptions of each BUL, including stresses affecting species and habitats, proposed conservation actions, and lists of the Tier I at-risk species and natural communities found in the landscape. In order to help prioritize conservation in each BUL, we denoted species that occur in only one or a few BULs with superscripts.

In the Shortgrass Prairie Ecoregion, some BULs are truncated by the Nebraska state boundary. We suggest opportunities for wildlife conservation in these areas based on review of corresponding adjacent state wildlife action plans.

Shortgrass Biologically Unique Landscapes

Kimball Grasslands
North Platte River
Oglala Grasslands
Panhandle Prairies
Pine Ridge
Platte Confluence (see Mixedgrass Ecoregion for description)
Sandsage (North and South combined)
Upper Niobrara River
Wildcat Hills (North and South combined)

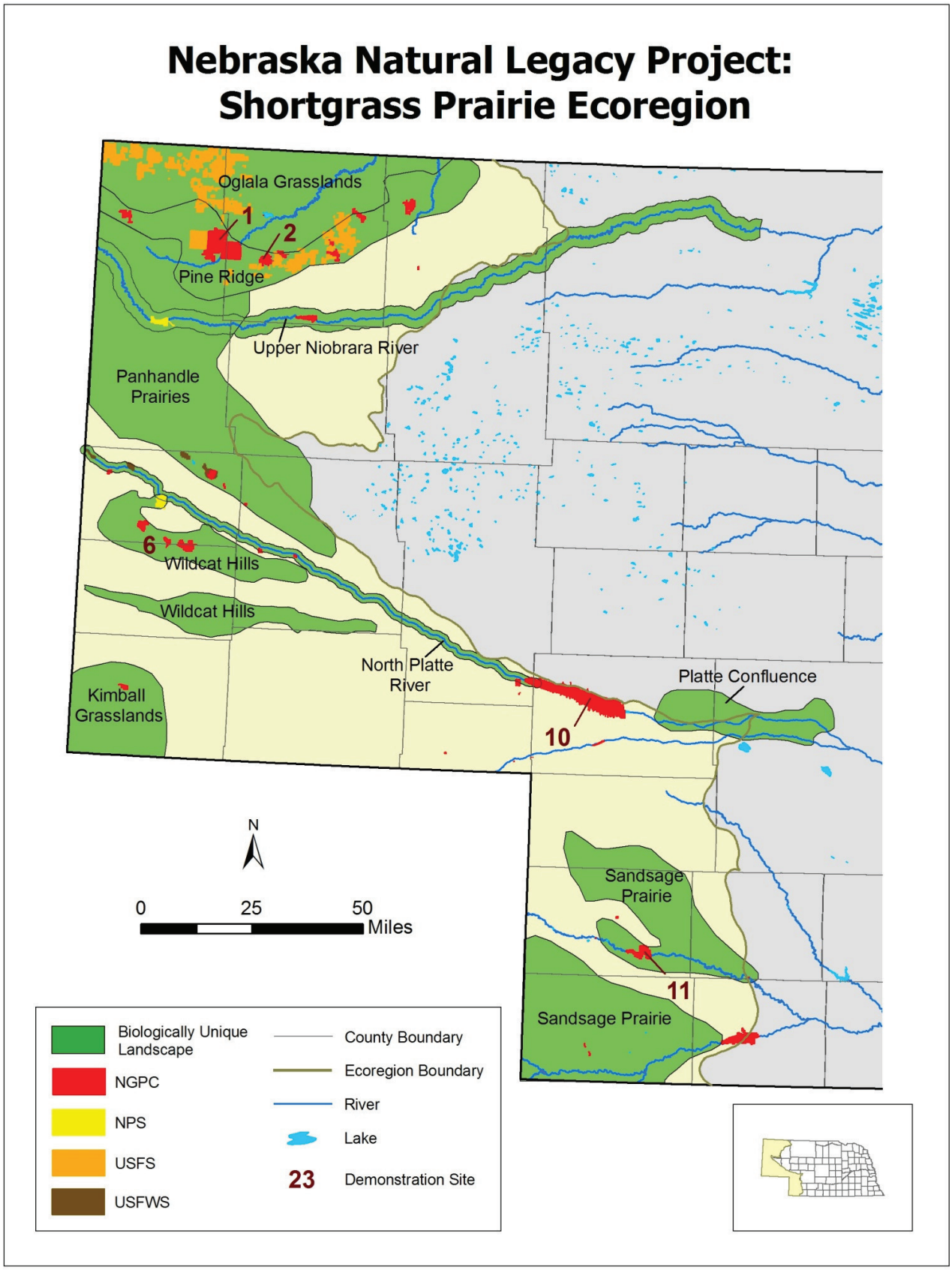
Demonstration Sites of the Shortgrass Prairie Ecoregion

Demonstration sites are locations across the state with potential for showcasing conservation projects and the results of sustainable management to the public. They provide opportunities for learning about the site's unique qualities and importance to at-risk species. See Chapter 4 for information on selecting demonstration sites. The Shortgrass Prairie Ecoregion map shows the location of demonstration sites in the area.

Site name	# on map	BUL
Enders Reservoir	11	Sandsage Prairie
Fort Robinson State Park	1	Pine Ridge
Lake McConaughy	10	N/A
Ponderosa Pine WMA	2	Pine Ridge
Wildcat Hills	6	Wildcat Hills

Descriptions of each site are found in the write-up for the BUL in which the site is found. The Lake McConaughy site is not within a BUL and the description is included here.

10. Lake McConaughy - Nebraska Game and Parks Commission
Lake McConaughy is the largest property in the Parks system, but over 80% of this property is lake. Uplands bordering the lake are Sandhills dune prairie and loess mixed-grass prairie. There are wetlands present at the Spring Park area. The lake attracts many resident and migrating birds, including many considered at-risk. This location has a visitor's center that attracts many people from Nebraska and from other states as well.


Nebraska Natural Legacy Project:
Shortgrass Prairie Ecoregion
Oglala Grasslands
1
2
Pine Ridge
Upper Niobrara River
Panhandle
Prairies
6
Wildcat Hills
Wildcat Hills
North Platte
River
Kimball
Grasslands
Platte Confluence
10
N
0
25
50
Miles
Sandsage
Prairie
11
Sandsage Prairie
Biologically Unique
Landscape
NGPC
NPS
USFS
USFWS
County Boundary
Ecoregion Boundary
River
Lake
23
Demonstration Site

Kimball Grasslands

Biologically Unique Landscape Description
This landscape occupies level to rolling hills and breaks of southwest Kimball County. Most level ground is in dry-land crops, primarily wheat. Native mixed-grass prairie still occupies the shallow-soiled breaks bordering Lodgepole Creek and other stream valleys.

The landscape is unique in that it supports the state's only population of the federally and state listed Colorado butterfly plant, within the Lodgepole Creek valley. The state-listed mountain plover nests in heavily-grazed native grasslands and cropland such as short wheat stubble. Playa wetlands are found on level plains in the northern portion of the BUL.

Stresses Affecting Species and Habitats

- Invasive plant species in native grasslands; the primary species of concern is cheatgrass
- Canada thistle invasion, herbicide spraying, and lowered groundwater levels in meadows where the Colorado butterfly plant occurs
- Tillage in fallow wheat fields that destroys mountain plover nests
- Sedimentation and hydrological alteration of playa wetlands
- Conversion of native prairie to cropland
- Decline in CRP enrollment
- Infrastructure development (e.g., roads, utility-scale wind turbines) in native grasslands

Conservation Strategies

- Work with private landowners whose meadows contain the Colorado butterfly plant to develop and implement forms of Canada thistle control that do not damage populations of the butterfly plant
- Restore and maintain the hydrology of Lodgepole Creek needed to sustain floodplain biodiversity and ecosystem function
- Conduct voluntary nest clearing of wheat fields to prevent damage to mountain plover nests
- Restore selected crop fields and CRP lands to short-grass prairie for mountain plover nesting habitat
- Prevent sedimentation and restore the hydrology of the playa wetlands
- Develop management agreements with landowners to implement grazing and burning strategies on native grasslands that favor mountain plover and native plant diversity
- Re-enrollment of CRP lands
- Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to native species. Avoid placing wind turbines in native prairies. See Nebraska Game and Parks Commission guidelines for wind energy development.

Collaborative Conservation Opportunities across State Borders
Coordinate with Colorado and Wyoming conservation organizations, particularly efforts to benefit shared species of greatest conservation need on the NE Kimball Grasslands/CO Midgrass Prairie and Dry Crop/WY borders (i.e., Weld County in CO and Laramie County in WY). Nebraska Tier I at-risk species identified also in the Colorado Wildlife Action Plan as

priority species include the swift fox, ferruginous hawk, McCown's longspur, and mountain plover. Nebraska Tier I species identified also in the Wyoming Wildlife Action Plan include the swift fox, burrowing owl, ferruginous hawk, McCown's longspur, and plains topminnow. Species lists may be updated as new information becomes available. Innovative methods for sufficient information exchange could aid the collaborative process.

Coordinated conservation actions should mirror priorities as identified in Colorado's Comprehensive Wildlife Conservation Strategy and/or conservation actions as identified in the Wyoming State Wildlife Action Plan (e.g., cheatgrass control measures). Collaborative conservation efforts across state borders should include also researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. Continuation and expansion of the Conservation Reserve Program (CRP) is a potential multi-state collaboration that can benefit mountain plovers, as well as other species. Additionally, USDA programs may have goals in common with Natural Legacy. In order to implement other conservation actions beyond state boundaries, it will be necessary to identify and develop staffing and funding sources. Funding that is not specific to any one state will provide more flexibility in project scope.

Tier I At-risk Species

Plants:
Colorado Butterfly Plant[1]
Matted Prickly-phlox[2]
Short's Milkvetch[1]

Animals:
Swift Fox
Burrowing Owl
Ferruginous Hawk
Loggerhead Shrike
Chestnut-collared Longspur[3]
McCown's Longspur[3]
Mountain Plover[1]
Plains Topminnow
Cheyenne Northern Pocket Gopher[1]
Regal Fritillary
Colorado Rita Dotted-blue[1]

Aquatic Communities:
Headwater, Warm Water Stream

Terrestrial Communities:
Pine-Juniper Scarp Woodland
Sandbar Willow Shrubland
Buckbrush Shrubland
Chokecherry-Plum Shrub Thicket
Freshwater Seep

Wheatgrass Playa Grassland
Cattail Shallow Marsh
Western Sand Prairie
Threadleaf Sedge Western Mixed-grass Prairie*
Wheatgrass Western Mixed-grass Prairie
Western Floodplain Terrace Grassland
Perennial Sandbar
Sandbar/Mudflat
Rock Outcrop*

* Priority for conservation in this BUL
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[2] Known to occur in only one other BUL
[3] Known to occur in only two other BULs
[4] Known to occur in only three other BULs

North Platte River

Biologically Unique Landscape Description
This landscape includes the North Platte River channel and associated freshwater and alkaline wetlands and riparian woodlands within the valley from the upper end of Lake McConaughy to the Wyoming/Nebraska border. The North Platte River valley has a braided, mainly tree-lined channel. Cottonwood, eastern red-cedar and Russian-olive are the dominant floodplain trees. The majority of the river floodplain is farmed. However, both alkaline and freshwater wetland complexes remain. Many of the freshwater meadows are heavily invaded by exotic grasses. The alkaline meadows tend to be in better condition. These meadows support unique assemblages of insects including tiger beetles, dragonflies and butterflies. North Platte valley wetlands are an essential migratory stopover point for waterfowl and shorebirds. Major protected areas in this landscape include Kiowa and Chet and Jane Fleisbach Wildlife Management Areas and lands owned by Platte River Basin Environments, Inc.

Stresses Affecting Species and Habitats

- Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- Invasive plant species in sandbars, meadows, and woodlands, including tall wheatgrass, Russian-olive, cheatgrass, Eurasian phragmites, narrow-leaf cattail, Canada thistle, and reed canary grass
- Ditching and drainage of wetlands
- Altered natural hydrology, particularly lack of high spring flows, low summer flows, and reduced sediment transport to maintain sandbars and fish habitat and to prevent channel degradation.
- Groundwater pumping and reduced in-stream flows that impact water levels in valley wetlands
- Sedimentation and drainage of backwater sloughs
- Conversion of meadows to cropland
- Urban and second home development

Conservation Strategies

- Implement planned grazing and haying strategies on public and private lands, in combination with prescribed fire and rest, to improve native plant diversity and vigor.
- Clear eastern red-cedar and undertake other tree clearings to maintain open meadow habitat for waterbirds and grassland birds
- Develop and implement best management practices to control and manage invasive plant communities
- Work with agronomists to discontinue use of tall wheatgrass, reed canary grass, and Garrison creeping-foxtail in plantings
- Acquire through voluntary fee title acquisition or place conservation easements on undeveloped reaches of the river and wet meadows to protect them from development
- Restore and/or maintain North Platte River hydrology necessary to sustain biological diversity and ecosystem function. Also, restore natural hydrology to important streams in the BUL.
- Restore wetland hydrology and connect backwater habitats to the river
- Facilitate the establishment of prescribed burn associations

Tier I At-risk Species

Plants:
Large-spike Prairie-clover
Platte River Dodder[1]

Animals:
Northern River Otter
Bell's Vireo
Burrowing Owl
Trumpeter Swan
Regal Fritillary
Plains Topminnow

Aquatic Communities:
Headwater, Warm Water Stream
Mid-order, Warm Water River

Terrestrial Communities:
Cottonwood-Peachleaf Willow Riparian Woodland
Cottonwood Riparian Woodland
Sandbar Willow Shrubland
Buckbrush Shrubland
Buffaloberry Shrubland
Chokecherry-Plum Shrub Thicket
Freshwater Seep
Western Alkaline Meadow*
Western Subirrigated Alkaline Meadow*
Western Sedge Wet Meadow*
Cattail Shallow Marsh

Reed Marsh
Western Alkaline Marsh*
Perennial Sandbar*
Sandbar/Mudflat*
Riverine Gravel Flats*

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Oglala Grasslands

Biologically Unique Landscape Description
This landscape occupies the plains and rolling hills in the northwestern Panhandle north of the Pine Ridge. Mixed-grass prairie covers most of the plains and hills. Rock outcrops and badlands are dispersed among the prairie, as are small stream valleys. The soils are predominantly clays derived from Pierre Shale, and the prairie is dominated by blue grama, green needle grass, and western wheatgrass.

This landscape is one of the larger, intact grasslands remaining in Nebraska and contains extensive badlands. Several plant communities including the western floodplain terrace grassland, silver sagebrush shrub prairie, greasewood shrub prairie, and northwestern mixed-grass prairie occur nowhere else in the state. Scattered playas occur in the landscape. These grasslands support extensive prairie dog towns, swift fox populations, and extensive habitat for grassland birds. Prairie dog towns within the BUL may be suitable for colonization of black-footed ferrets migrating from established colonies in southwestern South Dakota. The Oglala National Grassland occupies a large portion of this landscape.

Stresses Affecting Species and Habitats
- Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- Invasive plant species, primarily cheatgrass
- Potential disease in prairie dog populations

Conservation Strategies
- Work with private landowners and the U.S. Forest Service to implement ecologically-sensitive grazing strategies that reduce cheatgrass and promote native plant diversity and diverse wildlife habitats.
- Restore sagebrush communities on selected sites
- Manage public lands to maintain black-tailed prairie dog towns at an ecologically-functional level

Collaborative Conservation Opportunities across State Borders
Coordinate with South Dakota and Wyoming conservation agencies and tribes, particularly efforts to benefit shared species of greatest conservation need on the NE Oglala Grasslands/WY/SD Great Plains Steppe Ecoregion borders (i.e., Fall River and Shannon counties in SD and Niobrara County in WY). Nebraska Tier I at-risk species identified also in the South Dakota wildlife action plan include the swift fox, burrowing owl, ferruginous hawk, and long-billed curlew. And, species identified also in the Wyoming wildlife action plan include the swift fox, burrowing owl, ferruginous hawk, and long-billed curlew. Species lists may be updated as new information becomes available. Innovative methods for sufficient information exchange could aid the collaborative process.

Coordinated wildlife management actions (e.g., working with landowners; rotational burning, mowing, and grazing) should mirror medium to high priority conservation goals identified in the South Dakota Comprehensive Wildlife Conservation Plan and/or conservation actions identified in the Wyoming State Wildlife Action Plan (e.g., cheatgrass control measures). Collaborative conservation efforts across state borders should include researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. It will be necessary to identify and develop staffing and funding sources for implementation of conservation actions beyond state boundaries.

Tier I At-risk Species

Plants:
Barr's Milkvetch[1]
Dog-parsley[3]
Gordon's Wild Buckwheat[3]
Rocky Mountain Bulrush[1]

Animals:
Pierre Northern Pocket Gopher[2]
Swift Fox
Baird's Sparrow
Bell's Vireo
Brewer's Sparrow
Burrowing Owl
Chestnut-collared Longspur[3]
McCown's Longspur[3]
Ferruginous Hawk
Loggerhead Shrike
Long-billed Curlew
Regal Fritillary

Aquatic Communities:
Headwater, Warm Water Stream
Mid-order, Warm Water River*

Terrestrial Communities:
Cottonwood-Peachleaf Willow Riparian Woodland
Cottonwood Riparian Woodland
Sandbar Willow Shrubland
Buckbrush Shrubland
Buffaloberry Shrubland
Chokecherry-Plum Shrub Thicket
Freshwater Seep
Western Alkaline Meadow
Western Sedge Wet Meadow*
Playa Wetland
Spikerush Vernal Pool
Cattail Shallow Marsh
Threadleaf Sedge Western Mixed-grass Prairie*
Northwestern Mixed-grass Prairie*
Western Floodplain Terrace Grassland*
Silver Sagebrush Shrub Prairie*
Greasewood Shrub Prairie*
Perennial Sandbar
Sandbar/Mudflat
Rock Outcrop*
Badlands*

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Panhandle Prairies

Biologically Unique Landscape Description
This landscape occupies the plains and rolling hills of the northern Panhandle from the Pine Ridge south to the North Platte River valley. It includes the rough breaks and rocky outcrops associated with the Niobrara River in central Sioux County and the North Platte River in Scotts Bluff and Morrill counties. The plains include isolated sand dunes in west-central Sioux County. These dunes support Sandhills dune prairie and sandsage prairie. The landscape is occupied primarily by native prairie with only scattered cropland.

This BUL supports extensive, intact native prairie inhabited by swift fox, prairie dogs, and grassland birds. The North Platte National Wildlife Refuge and a couple of small wildlife management areas are the only protected lands in this landscape.

Stresses Affecting Species and Habitats

- Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- Invasive plant species, primarily cheatgrass
- Potential disease in prairie dog populations that can quickly kill an entire colony
- Conversion of prairie to cropland (e.g., in the Niobrara River valley)
- Fence type and placement that significantly hinders wildlife
- Potential losses in CRP enrollment
- De-watering of the Niobrara River
- Infrastructure development (e.g., roads, utility-scale wind turbines) in native grasslands

Conservation Strategies

- Implement ecologically-sensitive grazing and haying strategies on native prairies on private lands, in combination with prescribed fire and rest. In appropriate areas, these strategies can be designed to benefit mountain plover nesting.
- Coordinate with interested landowners to protect high-quality sites through conservation easements or voluntary fee title acquisition
- Re-enrollment of CRP lands and/or establishment of grazing strategies appropriate to the local flora on lands coming out of CRP enrollment
- Facilitate the establishment of prescription burn associations
- Promotion of fencing methods that are less detrimental to pronghorn antelope and other wildlife
- Environmental education to address water conservation strategies
- Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to native species. Avoid placing wind turbines in native prairies. See Nebraska Game and Parks Commission guidelines for wind energy development.

Collaborative Conservation Opportunities across State Borders

Coordinate with Wyoming conservation agencies and organizations, particularly efforts to benefit like species of greatest conservation need on the NE Panhandle Prairies/WY border (i.e., Goshen County in WY). Identified species include swift fox, burrowing owl, ferruginous hawk, long-billed curlew, and McCown's longspur. Species lists may be modified as new information becomes available. Innovative methods for sufficient information exchange could aid the collaborative process.

Coordinated wildlife management actions should mirror conservation actions (e.g., financial incentives to landowners for grassland conservation) identified in the Wyoming State Wildlife Action Plan. Collaborative conservation efforts across state borders should include researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. It will be necessary to identify and develop staffing and funding sources for implementation of conservation actions beyond state boundaries.

Tier I At-risk Species

Plants:
Blowout Penstemon
Gordon's Wild Buckwheat[3]
Large-spike Prairie-clover
Animals:
Swift Fox
Brewer's Sparrow
Burrowing Owl
Ferruginous Hawk
Loggerhead Shrike
Long-billed Curlew
Chestnut-collared Longspur[3]
Mccown's Longspur[3]
Nine-spotted Ladybird Beetle[1]
Regal Fritillary
Finescale Dace
Northern Redbelly Dace
Plains Topminnow
Sagebrush Lizard[2]

Aquatic Communities:
Headwater, Warm Water Stream

Terrestrial Communities:
Pine-Juniper Scarp Woodland
Rocky Mountain Juniper Woodland
Buckbrush Shrubland
Buffaloberry Shrubland
Chokecherry-Plum Shrub Thicket
Freshwater Seep
Western Alkaline Meadow
Western Sedge Wet Meadow*
Cattail Shallow Marsh
Sandsage Prairie
Western Sand Prairie*
Threadleaf Sedge Western Mixed-grass Prairie*
Wheatgrass Western Mixed-grass Prairie*
Western Floodplain Terrace Grassland
Rock Outcrop*

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Pine Ridge

Biologically Unique Landscape Description

The Pine Ridge is a rocky escarpment that rises several hundred feet from the surrounding plains in Sioux, Dawes, and Sheridan counties in northwest Nebraska. The escarpment is composed of sandstone, siltstones, and volcanic ash. Ponderosa pine woodlands and forest occupy many of the north- and east-facing slopes, and bottoms. Pine woodlands and mixed-grass prairie occupy the south- and west-facing slopes. Several streams, including the White River, Hat Creek, and Soldier Creek, originate in the Pine Ridge. The valleys of these northward flowing streams support deciduous woodlands and meadows in their floodplains.

Being a pine-dominated escarpment within the Great Plain's grassland, the Pine Ridge supports many at-risk species at the edge of their range, including two of the state's three populations of the Rocky Mountain bighorn sheep. There are several large protected areas within this landscape, including the Nebraska National Forest (Pine Ridge District), Fort Robinson State Park and several wildlife management areas.

Natural Legacy Demonstration Sites

1. Fort Robinson State Park - Nebraska Game and Parks Commission
The majority of Fort Robinson is rolling prairie uplands, but this large park has riparian areas and towering buttes and rock outcrops. Pine woodlands characteristic of the Pine Ridge provide habitat for the bighorn sheep and other at-risk species. A large part of the park was burned in 1989. Areas of the Pine Ridge have western mixed-grass prairie, ponderosa pine forest, dry-mesic ponderosa pine woodland, dry ponderosa pine open woodland and savanna. There is much potential for a variety of management types at the park.

2. Ponderosa Pine Wildlife Management Area - Nebraska Game and Parks Commission
The Ponderosa WMA is adjacent to U.S. Forest Service Property. There is potential for demonstration sites at a variety of state and federal properties in the Pine Ridge. Ponderosa has primarily coniferous forest cover with Squaw Creek running through it with associated deciduous forest. Western mixed-grass prairie, ponderosa pine forest, dry-mesic ponderosa pine woodland, dry ponderosa pine open woodland, and savanna can be found in the area. Prescribed fire and other management techniques are conducted on Ponderosa Pine WMA and other nearby properties.

Stresses Affecting Species and Habitats

- Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure.
- Invasive plant species, including cheatgrass, smooth brome, Kentucky bluegrass, eastern red-cedar, leafy spurge, and Canada thistle
- Lack of grazing and prescribed fire on many public lands
- Increased densities of ponderosa pine and to a lesser extent eastern red-cedar, because of a lack of fire.
- Housing and ranchette development

- Commercial logging practices that take old-growth trees, disturb groundcover, and create logging roads
- Catastrophic crown fires resulting from excess fuel accumulation.
- Pine bark beetle infestations
- Transmission of diseases between domestic sheep, goats, and Rocky Mountain bighorn sheep
- Poorly-sited utility-scale wind turbines

Conservation Strategies

- Implement planned grazing strategies on public and private lands to improve native plant diversity and vigor.
- Coordinate with landowners interested in using conservation easements to protect important areas for conservation
- Work with public and private landowners to implement prescribed, low-intensity surface fires to control exotic plants, reduce Ponderosa pine and eastern red-cedar densities, and reduce threat of crown fires. Dense stands of trees may require mechanical thinning prior to burning to reduce fuel loads.
- Conduct ecologically-sensitive tree thinning on private and public land
- Implement biodiversity management on public lands, including increased use of prescribed, low-intensity surface fire and planned grazing systems. A fire return interval of 5-10 years should be appropriate for public lands within the Pine Ridge.
- Treat pine infestations of pine bark beetles
- Support the development of local industries for pine wood products
- To avoid disease transmission, work with private landowners to limit domestic sheep and goats in areas used by bighorn sheep
- Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to species. See Nebraska Game and Parks Commission guidelines for wind energy development.

Tier I At-risk Species

Plants:
Dog-parsley[3]

Animals:
Rocky Mountain Bighorn Sheep[2]
Swift Fox
Fringe-tailed Myotis[2]
Pierre Northern Pocket Gopher[2]
Bell's Vireo
Brewer's Sparrow
Ferruginous Hawk
Pinyon Jay[2]
Mottled Duskywing[4]
Regal Fritillary
Tawny Crescent[1]

Aquatic Communities:
Headwater, Coldwater Stream*
Headwater, Warmwater Stream*

Terrestrial Communities:
Cottonwood-Peachleaf Willow Riparian Woodland
Cottonwood Riparian Woodland
Peachleaf Willow Woodland
Green Ash-Elm-Hackberry Canyon Bottom Woodland*
Ponderosa Pine Forest*
Dry-Mesic Ponderosa Pine Woodland*
Dry Ponderosa Pine Open Woodland and Savanna*
Pine-Juniper Scarp Woodland*
Buckbrush Shrubland
Buffaloberry Shrubland
Skunkbrush Sumac Shrubland
Chokecherry-Plum Shrub Thicket
Mountain Mahogany Shrubland
Freshwater Seep*
Western Sedge Wet Meadow*
Cattail Shallow Marsh
Western Sand Prairie*
Threadleaf Sedge Western Mixed-grass Prairie*
Northwestern Mixed-grass Prairie
Wheatgrass Western Mixed-grass Prairie
Western Floodplain Terrace Grassland
Northern Chalk Bluff and Cliff*
Western Sandstone Cliff*
Rock Outcrop*

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Sandsage Prairie

Biologically Unique Landscape Description
This landscape is composed of low rolling sand dunes and stream breaks in a four county area in far southwest Nebraska. Loess mixed-grass prairie and western mixed-grass prairie occur on the breaks and bluffs of the Republican and Frenchman rivers, while sandsage prairie occurs on rolling sand dunes. The mixed-grass prairies are partially fragmented by cropland and degraded in some areas from some livestock grazing practices that reduce plant species diversity. Center pivot development has highly fragmented the sandsage prairies. The landscape is significant because it contains some of the last remnants of sandsage prairie and some of the highest quality loess mixed-grass prairies in the state. Historically, the

Sandsage Prairie BUL contained lakes and wetlands, but these have disappeared in recent decades as the groundwater table has lowered, primarily because of center pivot irrigation. If the groundwater were restored, these wetland areas may reappear. Several higher quality small streams flow into the Republican River, including Buffalo Creek and Rock Creek. The stretch of the Republican River above Swanson Reservoir is not as degraded as lower reaches and still contains a braided channel and open sandbars. The largest protected areas in the landscape are Enders Reservoir and Swanson Reservoir Wildlife Management Areas.

Natural Legacy Demonstration Site

11. Enders Reservoir - Nebraska Game and Parks Commission
Enders Reservoir includes nearly 4000 acres of woodlands, short-grass, mixed-grass, and sagebrush prairie surrounding a large reservoir. This property has a prairie dog town and is one of the larger public properties with sandsage prairie. Sandsage prairie has proved to be a challenging habitat type to manage on private lands, so Enders Reservoir will be a valuable demonstration site for showcasing sandsage prairie management.

Stresses Affecting Species and Habitats

- Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure in prairies, which can lead to exotic plant invasion and over-abundance of sandsage brush
- Spraying of sandsage prairies to reduce sandsage abundance which greatly reduces native plant diversity and degrades wildlife habitat
- Invasive plant species, primarily smooth brome and cheatgrass, in prairie
- Conversion of native grasslands to cropland, especially conversion of sandsage prairie to center pivot irrigation
- Groundwater withdrawal for center pivot irrigation, which affects water levels in wetlands and streams
- Poorly-sited utility-scale wind turbines

Conservation Strategies

- Implement ecologically-sensitive grazing strategies and prescribed fire on native prairies, specifically sandsage prairie. The use of prescribed fire and specific grazing methods in sandsage prairies can likely reduce sandsage brush densities and eliminate the need to spray these sites to reduce brush.
- Work with landowners and others to restore groundwater levels and potentially restore wetlands in the sandsage prairie
- Work with the Natural Resource Conservation Service to eliminate the practice of herbicide spraying on private lands as a method of reducing sandsage abundance
- Implement prescribed burning on private lands as a method of reducing sandsage in sandsage prairies and controlling exotic cool-season grasses in mixed-grass prairies
- Remove invasive woody species, restore wetlands, and implement ecologically-sensitive grazing within the Republican River valley upstream from Swanson Reservoir

- Work with wind energy companies to select turbine sites that minimize fragmentation and impacts to native species. Wind farms should not be located within the recommended radius of prairie grouse leks and nesting grounds. Wind turbines should be placed in cropland or old fields where possible. Turbines can be halted temporarily during peak migration periods for bats and birds. Pre- and post-construction monitoring should be implemented. See Nebraska Game and Parks Commission guidelines for wind energy development.

Collaborative Conservation Opportunities across State Borders
Coordinate with Colorado and Kansas conservation agencies and organizations, particularly efforts to benefit shared species of greatest conservation need on NE Sandsage Prairie BUL/CO Midgrass Prairie, Sand Dune/Shrub Complex and Dry Crop/KS Shortgrass Prairie Conservation Region, especially Sandsage Shrubland borders (i.e., Yuma County in CO and Cheyenne County in KS). Nebraska Tier I at-risk species identified also in the Colorado wildlife action plan as priority species include ferruginous hawk, Brewer's sparrow, greater prairie-chicken and short-eared owl. And, species identified also in the Kansas wildlife action plan include burrowing owl, ferruginous hawk, and short-eared owl. Species lists may be modified as new information becomes available. Novel methods for sufficient information exchange could aid the collaborative process.

Coordinated wildlife management actions (e.g., minimization of habitat fragmentation, increased plant biodiversity) should mirror priorities identified in Colorado's Comprehensive Wildlife Conservation Strategy and/or strategies identified in Kansas' Comprehensive Wildlife Conservation Plan. Collaborative conservation efforts across state borders should include researchers, federal and non-profit environmental program coordinators, and landowners, particularly those with properties extending over state lines. One such partnership is the Republican River Riparian Project (RRRP): a tri-state conservation initiative; its goal is to enhance the water quality and quantity within the Republican River Basin (www.swrcd.org/RRRPP.html). In order to implement successful conservation actions beyond state boundaries, it will be necessary to identify other potential partners, as well as develop staffing and funding sources.

Tier I At-risk Species

Plants:
Large-spike Prairie-clover
Sandhill Goosefoot[1]

Animals:
Bell's Vireo
Brewer's Sparrow
Burrowing Owl
Ferruginous Hawk
Greater Prairie-Chicken
Loggerhead Shrike

Short-eared Owl
Ghost Tiger Beetle
Regal Fritillary
Plains Topminnow

Aquatic Communities:
Headwater, Cold Water Stream*
Headwater, Warm Water Stream*
Mid-order, Warm Water River

Terrestrial Communities:
Cottonwood-Peachleaf Willow Riparian Woodland
Cottonwood Riparian Woodland
Sandbar Willow Shrubland
Buckbrush Shrubland
Chokecherry-Plum Shrub Thicket
Freshwater Seep
Western Sedge Wet Meadow
Cattail Shallow Marsh
Loess Mixed-grass Prairie*
Sandhills Dune Prairie
Sandsage Prairie*
Wheatgrass Western Mixed-grass Prairie
Perennial Sandbar
Sandbar/Mudflat
Rock Outcrop

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Upper Niobrara River

Biologically Unique Landscape Description
This landscape occupies the Niobrara River channel, and a two-mile wide buffer on each side of the river, from eastern Cherry County westward to the Nebraska/Wyoming border. In the far west the Niobrara River is a narrow, coldwater stream with an open, gently sloping valley with few trees. Rocky outcrops are also common along the valley bluffs and mixed-grass prairie occurs on most of the bluffs. Eastward as the river gains flows, the valley becomes entrenched. Where the river enters the Sandhills in western Cherry County, the valley is several hundred feet deep. Ponderosa pine woodlands occupy portions of the bluff and cottonwood dominated-woodlands occupy portions of the floodplain. Portions of the valley bottom are in cropland.

The only dam on this reach of the Niobrara River is the one that forms Box Butte Reservoir in Dawes County, otherwise flows on the river are fairly natural. The upper Niobrara River supports a unique assemblage of cold-water fish including the pearl dace and the state-listed blacknose shiner and finescale dace. Wet meadows in the Niobrara River valley in western Sioux County support the state's only known population of Ute lady's-tresses orchid. Protected areas on the upper Niobrara include Agate Fossil Beds National Monument, The Nature Conservancy's Cherry Ranch, and Prairie Plains Resource Institute's Guadalcanal Memorial Prairie.

Stresses Affecting Species and Habitats

- Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure in both uplands and riparian areas
- Invasive plant species, including hound's-tongue, reed canary grass, Garrison creeping-foxtail, quackgrass, Russian-olive, and narrow-leaf cattails
- Reduced river flows resulting from irrigation development. This threat is most prevalent in the western reaches of the river.
- Housing and ranchette development
- Conversion of valley bottom and terrace meadows to cropland
- Erosion and contamination from livestock watering in the river
- Aquatic nuisance species, especially zebra mussel

Conservation Strategies

- Implement ecologically-sensitive grazing and haying strategies on native prairies on private lands, in combination with prescribed fire and rest.
- In meadows containing the Ute lady's-tresses orchid, implement haying and grazing strategies that benefit the orchid
- Removal of invasive plant species such as Russian-olive
- Maintain the natural hydrology of the Niobrara River and implement conservation strategies necessary to sustain biological diversity and ecosystem function (e.g., restoring center pivot lands to native grassland)
- Work with landowners to install livestock watering facilities in uplands to avoid having cattle water from the stream
- Coordinate with interested landowners to protect high-quality sites through conservation easements
- Restrict stocking of exotic fish in the Niobrara river
- Modify culverts that impede fish moving upstream in the river
- Education about aquatic nuisance species control methods

Collaborative Conservation Opportunities across State Borders

Coordinate with Wyoming conservation agencies and organizations, particularly efforts to benefit shared species of greatest conservation need on the NE Upper Niobrara River BUL/WY border (i.e., Niobrara County in WY). Identified species include the plains topminnow, finescale dace, burrowing owl, ferruginous hawk, long-billed curlew, and swift fox. Species lists may be modified as new information becomes available. Innovative methods for sufficient information exchange could aid the collaborative process.

Tier I At-risk Species

Plants:
Blowout Penstemon
Gordon's Wild Buckwheat[3]
Large-spike Prairie-clover
Meadow Lousewort[1]
Ute Lady's-tresses[1]

Animals:
Northern River Otter
Swift Fox
Bell's Vireo
Brewer's Sparrow
Burrowing Owl
Ferruginous Hawk
Long-billed Curlew
Trumpeter Swan
Regal Fritillary
Blacknose Shiner
Finescale Dace
Northern Redbelly Dace
Plains Topminnow

Aquatic Communities:
Headwater, Cold Water Stream*
Headwater, Warm Water Stream
Mid-order Warm Water River*

Terrestrial Communities:
Cottonwood-Peachleaf Willow Riparian Woodland
Cottonwood Riparian Woodland
Green Ash-Elm-Hackberry Canyon Bottom Woodland
Sandbar Willow Shrubland
Buckbrush Shrubland
Buffaloberry Shrubland
Chokecherry-Plum Shrub Thicket
Freshwater Seep
Western Alkaline Meadow
Western Subirrigated Alkaline Meadow*
Western Sedge Wet Meadow*
Cattail Shallow Marsh
Reed Marsh
Western Sand Prairie*
Threadleaf Sedge Western Mixed-grass Prairie*
Wheatgrass Western Mixed-grass Prairie
Western Floodplain Terrace Grassland*

Perennial Sandbar
Sandbar/Mudflat
Rock Outcrop*

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Wildcat Hills

Biologically Unique Landscape Description
The Wildcat Hills is a rocky escarpment that rises several hundred feet on the south side of the North Platte River in Scotts Bluff, Banner, and Morrill counties. The escarpment is composed primarily of sandstone, siltstone and volcanic ash. The north bluff of the escarpment is steep and deep canyons cut into the bluff. The canyons support stands of mountain-mahogany, eastern red-cedar and Rocky Mountain juniper. The north-facing slopes of the escarpment support Ponderosa pine woodlands. Mixed-grass prairie, rock outcrops, and scattered patches of sandsage prairie occupy the remainder of the Wildcat Hills.

The Wildcat Hills are significant in supporting an intact mosaic of pine woodlands and mixed-grass prairie and the largest stands of mountain-mahogany shrubland in the state. The Wildcat Hills also are home to one of three Rocky Mountain bighorn sheep populations in the state. Protected lands within the Wildcat Hills include Scotts Bluff National Monument; Platte River Basin Environment's Bead Mountain, Carter Canyon, and Montz ranches; The Nature Conservancy's Murphy Ranch; and the Nebraska Game and Parks Commission's Cedar Canyon and Buffalo Creek Wildlife Management Areas and Wildcat Hills State Recreation Area.

Natural Legacy Demonstration Site

6. Wildcat Hills
The Wildcat Hills contains several properties that are open to the public: Buffalo Creek Wildlife Management Area (WMA), Cedar Canyon WMA, Wildcat Hills WMA, Platte River Basin Environments, Inc. Bead Mountain, Montz Point, and Carter Canyon ranches, Scotts Bluff National Monument, and The Nature Conservancy's Murphy Ranch. The entire wildlands complex encompasses approximately 30,000 acres, including rugged topography with ravines separated by steep, eroded rocky outcrops. A nature center provides education opportunities. Managers have recently found evidence of the invasive mountain pine beetle and are taking steps to slow its spread. This complex contains all the plant communities of the BUL.

Stresses Affecting Species and Habitats

- Specific livestock grazing and haying practices that may reduce native plant diversity and promote uniform habitat structure
- Lack of grazing and prescribed fire on many public lands
- Invasive plant species, including, cheatgrass, smooth brome, Kentucky bluegrass, eastern red-cedar, and Canada thistle
- Increased densities of Ponderosa pine and to a lesser extent eastern red-cedar because of a lack of fire
- Housing and ranchette development
- Potential for catastrophic crown fires resulting from excess fuel accumulation
- Pine bark beetle infestations
- Transmission of diseases between domestic sheep, goats, and Rocky Mountain bighorn sheep
- Poorly-sited utility-scale wind turbines and oil drilling

Conservation Strategies

- Implement strategic grazing strategies on public and private lands to improve native plant diversity and vigor
- Work with public and private landowners to implement prescribed, low-intensity surface fires to control exotic plants, reduce Ponderosa pine and eastern red-cedar densities, and reduce the threat of crown fires. Dense stands of trees may require mechanical thinning prior to burning to reduce fuel loads. A fire return interval of 5-10 years should be appropriate for lands within the Wildcat Hills.
- Support the development of local industries for pine wood products
- Treat pine infestations of pine bark beetles
- Coordinate with landowners interested in using conservation easements and voluntary acquisitions to protect important areas for conservation
- To avoid disease transmission, work with private landowners to limit domestic sheep and goats in areas used by bighorn sheep
- Promotion of fencing methods that are less detrimental to wildlife
- Environmental education programs to increase awareness towards wildlife, and reach out to the growing number of residents and many visitors in the Wildcat Hills
- Work with energy companies to select turbine and oil drilling sites that minimize fragmentation and impacts to wildlife. See Nebraska Game and Parks Commission guidelines for wind energy development.

Tier I At-risk Species

Plants:
Dog-parsley[3]
Matted Prickly-phlox[2]

Animals:
Fringe-tailed Myotis[2]
Rocky Mountain Bighorn Sheep[2]
Swift Fox
Bell's Vireo

Brewer's Sparrow
Burrowing Owl
Long-billed Curlew
Pinyon Jay[2]
Short-eared Owl
Regal Fritillary
Plains Topminnow
Sagebrush Lizard[2]

Aquatic Communities:
Headwater, Warm Water Stream

Terrestrial Communities:
Ponderosa Pine Forest*
Dry Ponderosa Pine Open Woodland and Savanna*
Pine-Juniper Scarp Woodland*
Rocky Mountain Juniper Woodland
Buckbrush Shrubland
Chokecherry-Plum Shrub Thicket
Mountain Mahogany Shrubland*
Freshwater Seep*
Western Alkaline Meadow
Western Sedge Wet Meadow
Sandsage Prairie*
Western Sand Prairie*
Threadleaf Sedge Western Mixed-grass Prairie*
Wheatgrass Western Mixed-grass Prairie*
Western Floodplain Terrace Grassland
Western Sandstone Cliff*
Rock Outcrop*
Badlands*
Riverine Gravel Flats